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# Study and experimental investigation of flow and flexural properties of natural fiber reinforced self compacting concrete

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## Abstract

The essentiality of self-compacting concrete can be understood from the fact that there is an increasing problem of lack of skilled labor in the construction industry. The benefit of SCC is that it provides faster construction period and allows an early development of strength for concrete. The above paper deals with flexure and flow properties of self-compacting concrete reinforced with a combination of steel with sisal and abaca fibers. Three percentages of sisal (0.5%, 1%, 1.5%) or three of abaca (0.5%, 1%, 1.5%) are mixed with a uniform 0.3% and 0.6% of steel fibers. Split tensile strength and flexure strength are evaluated at 7 days and 28 days for various specimens of self-compacting concrete made by variation of fiber provides an understanding of mechanical properties and tests like Slump flow, J-ring and U-box test are performed for an understanding of flow of self-compacting concrete

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**Keywords:** Self Compacting Concrete; Flexure; Flow; Sisal; Abaca; Steel

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## 1. Introduction

Self-compacting concrete (SCC) is a concrete which is formed without any need for vibration. To ensure that

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adequate amount of compaction is received by the concrete and it has proper homogeneity the idea of self-compacting concrete was given for the first time by Hajime Okamura in the 1980's. Self-compacting concrete is a high-performance concrete which is able to flow in its own weight and is able to provide the necessary homogeneity even when there is heavy reinforcement. It provides with good flowing ability and is able to pass to complicated structures and also provides with resistance to segregation. These are a few important properties associated with self-compacting concrete. These properties are achieved by a few modifications like increase in amount of fineness, reducing the water-powder ratio and by use of Superplasticizer. [1] The output in terms of shrinkage and creep is increased by increasing fineness content as it causes the increase in the volume of paste in the self-compacting. [2] In order to improve the segregation resistance of SCC there is use of stabilizer called viscosity modifier agent (VMA). This also allows for a reduction in segregation and also reduces chances of shrinkage and creep. [3] The concrete has to have a proper proportion as because if it is not homogenous during placing and after compaction it might lead to segregation, bleeding Here follows further instructions for authors. Honeycombing in order to compose a freshly prepared SCC. In the above study we investigate the effect of various dosages of fibers percentages along with steel fibers on mechanical properties of SCC. [1,3].

## 2. Materials

### 2.1 Cement and Water

Ordinary Portland cement (Ramco Cement Supplier) of 53 grade is used in the mix design. Water-cement ratio is 0.42 for this mix design. The test on the cement was done to find out the specific gravity and the Initial Setting time of the cement given by

$$\frac{W_2 - W_1}{(W_2 - W_1) - (W_3 - W_4) * 0.79} = 3.21 \text{ g} \quad (1)$$

Initial setting time of the cement is 30 minutes for 53 OPC Grade cement. [4]

### 2.2 Coarse Aggregate and Fine Aggregate

Sand is used as a Fine aggregate ranging from 0-2 mm aggregate and angular aggregate of size between 8.00 mm to 16 mm are used as a coarse aggregate.



Fig.1. Coarse Aggregate



Fig.2. Fine Aggregate

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